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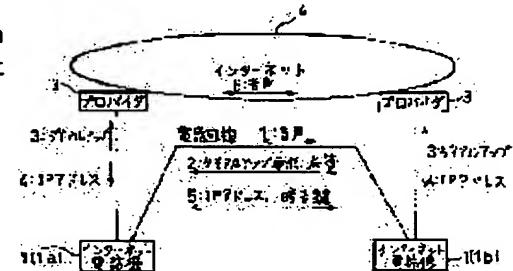
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(54) NETWORK COMMUNICATION SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a network communication system in which an Internet phone call and the Internet VPN with a cheap long distance call (communication) are utilized without a troublesome operation and a long wait time for the connection.

SOLUTION: Caller side and called side Internet telephone sets 1a, 1b are connected directly via a telephone line to start a speech. Thereafter when the direct connection time exceeds a preset time, while keeping the direct connection and the speech, the caller side and the called side are connected via an Internet 4 so as to enable to communicate eachother. After the connection via the Internet 4 is successful, the speech is switched to the communication via the Internet 4 and the direct connection via the telephone line is interrupted.



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CLAIMS

[Claim(s)]

[Claim 1] The network communication system characterized by providing the following. A direct file with a communications partner. So that connection with the communications partner which went via the communication network can be made simultaneously. The communication device of the call origination side prepared possible [at least two circuits and connection] and a called party is included. at least one side of the communication device of the above-mentioned call origination side and a called party Direct file time with a communications partner is supervised, and it has a connect-time surveillance means to detect that the direct file time concerned reached the setup time. the communication device of the above-mentioned call origination side and a called party Maintaining the present direct file and continuing communication between both, when the direct file is being performed among both using one circuit and the above-mentioned connect-time surveillance means detects that the direct file time exceeded the above-mentioned setup time. Communication network connecting means which make connection with the communications partner which went via the communication network using the circuit of another side. A change means to cut the circuit which switches to the communication via a communication network and is used for a direct file after succeeding in the connection via a communication network.

[Claim 2] It is the network communication system according to claim 1 which the communication device of the above-mentioned call origination side and a called party is telephone equipment which has a telephone call function, and is characterized by using above-mentioned one circuit for a direct telephone call, and using the circuit of above-mentioned another side for the telephone call via a communication network.

[Claim 3] The communication device of the above-mentioned call origination side and a called party is a network communication system according to claim 1 characterized by being network connection equipment for connecting a single terminal unit or a single Local Area Network to a communication network.

[Claim 4] At least one side of the communication device of the above-mentioned call origination side and a called party Instead of the above-mentioned connect-time surveillance means, the communication amount of data after a direct file start with a communications partner is supervised. Have an amount-of-data surveillance means to detect that the amount of data concerned reached preset value, and the connection via a communication network by the above-mentioned communication network connecting means. The network communication system according to claim 3 characterized by replacing with the above-mentioned connect-time surveillance means, and being carried out based on the above-mentioned detection result of an amount-of-data surveillance means.

[Claim 5] At least one side of the communication device of the above-mentioned call origination side and a called party is a network communication system according to claim 1, 2, 3, or 4 characterized by having a notice means to notify the self identification information added to the communication data which went via the communication network to a communications partner into a direct file with a communications partner.

[Claim 6] The communication device of the above-mentioned called party is a network communication system according to claim 5 characterized by being what acquires the address as identification information each time by making dialup connection to the Internet which is a communication network.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the network communication system which builds an Internet telephone and Internet VPN (Virtual Private Network).

[0002]

[Description of the Prior Art] as one of the means of communications -- an analog telephone line and ISDN (Integrated Services Digital Network) etc. -- the dial-up line network is used more widely than before. With this dial-up line network, in advance of communication, a network side secures a connection (logical communication path) between called parties a call origination side, and calls a called party. In such connection type communication system, establishment of a connection becomes difficult, so that a channel is long. Therefore, generally the tariff structure according to the communication range is used for a dial-up line network. For this reason, in the case of the usual telephone directly connected with a partner through a dial-up line network, the phonecall charges at the time of a long distance telephone call have the fault of becoming a large sum. On the other hand, in the case of the direct file through the dial-up line network, while it is connectable by easy operation of inputting the telephone number, when a bell is sounded, a partner is called and a partner answers it, there is the advantage in which ***** can be started. Moreover, if a partner does not answer, it can judge that he is absent, and in this case, telex-rate gold is unnecessary.

[0003] Moreover, connect terminals, such as a personal computer (a personal computer is called hereafter), to a dial-up line network using a modem or a terminal adapter, or it is LAN (Local Area Network). It is the case where the upper terminal is connected to a dial-up line network using the router for remote connection, and when carrying out online communications to a distant partner terminal directly through a dial-up line network, it is the same as that of the above.

[0004] On the other hand, in recent years, the Internet is spreading quickly as new means of communications. In case the communication equipment of a transmitting side transmits data in the case of the Internet, a data stream is divided for every predetermined size, datagram (packet) is created, and it sends out to neighboring communication equipment. The address (IP address) in the Internet of the communication equipment of a receiving side is added to each datagram. When datagram is received, based on the IP address of a transmission place (receiving side), communication equipment sends out data to the communication equipment of the direction near a receiving side among neighboring communication equipment. Thereby, even if it does not establish a connection, the data of a transmitting side are sent to a receiving side. In such connectionless type communication system, no communication equipment of a transmitting side and a receiving side grasps the communication path between both. Therefore, in the case of the Internet, the fixed tariff structure is adopted in many cases for every predetermined period for every tariff structure according to the amount of data (communication time), or year. Since such the tariff structure does not receive influence in the communication range between a transmitting side and a receiving side, its possibility that communication costs will be reducible by communicating using the Internet by long-distance communications, such as communication with overseas, especially is high.

[0005] Although the above-mentioned Internet was conventionally used for the data communication of character subjects, such as an E-mail, in recent years, the Internet telephone, the video conference system, etc. are used also for the real-time two-way communication between communication equipment with improvement in the bandwidth of a circuit. Moreover, the Internet is used also for connecting LAN to the Internet through the router for remote connection etc., and building Internet VPN.

[0006]

[Problem(s) to be Solved by the Invention] In an Internet telephone, when it can talk over the telephone only by phonecall charges with a neighboring Internet access provider (provider) fundamentally and performs a long distance

call, compared with the direct file through the dial-up line network, phonecall charges can be cut down sharply. However, unless the telephone call partner has connected on the Internet, it cannot call, but now, there is also a fault that ** and an absent check cannot be performed, either. Although a call cannot be answered from a partner in the internet telephone of the type which built Internet telephone software into it especially using the personal computer if a personal computer etc. always is not started, the personal computer in the 1st is not usually started by SOHO (small office, home office).

[0007] Moreover, it can talk over the telephone only by phonecall charges with a provider by the case of connection of others which went via the Internet, such as Internet VPN, as well as the above. However, if the IP address which the communications partner always connected and fixed on the Internet too is not owned, communication cannot be started with a desired partner at arbitrary time.

[0008] By the way, the method which connects various kinds of communication equipment (telephone equipment, personal computer with communication facility, etc.) to the above-mentioned Internet can be divided roughly into two, connection by the dedicated line, and dialup connection. The connection method by the dedicated line is a method which prepares the communication wire of exclusive use between communication equipment and a provider, and always connects each communication equipment and the Internet. In this case, since communication equipment is always connected to the Internet, a peculiar IP address is assigned to the communication equipment concerned. This method is adopted at the comparatively big company, university, etc., and the user has usually paid fixed costs to the telephone company etc. as maintenance costs of a communication wire (dedicated line).

[0009] On the other hand, dialup connection is a method which connects communication equipment and the Internet to connect with the Internet. The connection with the Internet communicates with a provider using a dial-up line network etc., and when a provider relays this communication, it is performed. A provider assigns a vacant IP address as an IP address of the communication equipment concerned, when communication equipment is connected. Thereby, an IP address can be shared among two or more communication equipment. Moreover, the communication line of exclusive use [by this method] between each communication equipment is also unnecessary. Consequently, when there is little traffic, compared with a dedicated line circuit, the Internet can be used cheaply. Therefore, a dialup connection method is adopted in many cases, when there is comparatively little traffic, such as comparatively small company, home, etc.

[0010] However, when the communication equipment of a called party has adopted the dialup connection method, the communication equipment by the side of call origination cannot judge in advance whether the called party is connected to the Internet. If the communication equipment of a called party is connected to the Internet at the time of call origination, although the communication equipment by the side of call origination can communicate with a called party, when that is not right, not both communication equipment can communicate. Therefore, it does not restrict connecting certainly but has the trouble that readiness is missing. Especially this problem becomes fatal [an Internet telephone, a video conference system etc.], when it is going to carry out two-way communication on real time. Moreover, even connection with a provider may not be able to be performed in the time zone which the dialup connection with a provider concentrates.

[0011] In addition, although it will generate if such problems are the cases where each communication equipment connects with a network if needed, such as a case of not only the Internet but personal computer communications, as shown below, in making dialup connection to the Internet, the further problem occurs.

[0012] Specifically, each communication equipment which constitutes the Internet transmits the datagram concerned to the predetermined partner point based on the IP address of the transmission place contained in datagram. Therefore, the transmitting side needs to grasp the IP address of a receiving side in communicating. However, in a dialup connection method, it does not opt for the IP address of each communication equipment until it connects with each provider. Therefore, a transmitting side cannot grasp the IP address of a receiving side beforehand like a leased-connection method.

[0013] Then, in the former, in order to solve this problem and to relay communication between each communication equipment, the server with the IP address of fixation is installed on the Internet. In this case, each communication equipment starts communication with the above-mentioned server first, after connecting with the Internet. If each communication equipment starts communication, a server will relay communication with one side to another side. In this case, since the datagram sent out to the IP address of a server is transmitted to a partner's communication equipment, each communication equipment does not need to know a partner's IP address. Consequently, even if it is between the communication equipment which is making dialup connection, it can communicate convenient at all.

[0014] However, when a server is prepared, it is necessary to maintain a server and the problem that maintenance costs start newly occurs. Moreover, when the server is crowded, the problem that it cannot communicate even if self-communication equipment and a partner's communication equipment are vacant is also derived. Furthermore, it is difficult not to establish the method of looking for a communications partner within a server, but to find a desired

communications partner. For example, at present, a partner is looked for in many cases by the following search methods. That is, each communication equipment registers its name to a server. A server displays the received list of names and each communication equipment chooses a desired partner from the inside of the list. By this method, the time and effort at the time of search increases as the number of jointers increases.

[0015] Moreover, though a server is installed, if a partner's communication equipment is not connected to the network, the trouble that communication cannot be started is not still solved.

[0016] Therefore, in the case of the small-scale company or small-scale individual who do not own the fixed IP address, in order to start communication with a desired partner at arbitrary time, even if telex-rate gold becomes a large sum, the gestalt fake colander of the direct file through the dial-up line network is not obtained.

[0017] Moreover, in the case of an Internet telephone, time to telephone can be beforehand connected to a telephone call partner, it can connect with a provider at the set time, telephone software can be started, and it can talk over the telephone for the first time by specifying a telephone call partner on the software concerned. Thus, since an Internet telephone needs complicated operation compared with the usual telephone which used the dial-up line network, it is difficult the Internet telephone for ordinary users to use it every day.

[0018] In addition, even if the telephone call partner has not connected with the Internet, the Internet telephone in which a call is possible is also developed. Also by this method, the server is too arranged on the Internet. By this method, after an origination side logs in and connects with the above-mentioned server, a partner's telephone number is inputted and it is told to a server. And the server which received a partner's telephone number transmits the message of the purport which has required the Internet telephone for the communications partner through a telephone network, and if a partner accepts it, the telephone call of it will be attained. However, connection is impossible if a partner's personal computer is not always a power supply input state in this method.

[0019] Moreover, in the case of the Internet telephone of the above-mentioned all directions formula, there is also a problem that the long latency time is required compared with the usual telephone which used the dial-up line network by the time it called the partner (when especially a server is used).

[0020] As mentioned above, in the former, the gestalt which carries out a direct file to a partner through a dial-up line network, and the topology which went via the Internet exist independently, the advantage and demerit are in each, and the present condition is not being necessarily what a user can satisfy. For the moment, a method which has the advantage of both the above-mentioned topologies does not exist.

[0021] this invention is made in view of the above, and the main purpose is in offering the network communication system which can use a cheap Internet telephone, cheap Internet VPN, etc. of a long distance telephone call (communication) charge without the long latency time, without a user doing complicated operation.

[0022]

[Means for Solving the Problem] The network communication system concerning invention of a claim 1 So that a direct file with a communications partner and connection with the communications partner which went via the communication network can be made simultaneously, in order to solve the above-mentioned technical problem The communication device of the call origination side prepared possible [at least two circuits and connection] and a called party is included. at least one side of the communication device of the above-mentioned call origination side and a called party Direct file time with a communications partner is supervised, and it has a connect-time surveillance means to detect that the direct file time concerned reached the setup time. the communication device of the above-mentioned call origination side and a called party Maintaining the present direct file and continuing communication between both, when the direct file is being performed among both using one circuit and the above-mentioned connect-time surveillance means detects that the direct file time exceeded the above-mentioned setup time The communication network connecting means which make connection with the communications partner which went via the communication network using the circuit of another side, After succeeding in the connection via a communication network, it is characterized by having a change means to cut the circuit which switches to the communication via a communication network and is used for a direct file.

[0023] In addition, as the above-mentioned circuit, a dial-up line (a digital circuit or analog networks, such as ISDN), the radio circuit of mobile communication system, a CATV (CATV) circuit, a dedicated line, etc. are mentioned. As the above-mentioned communication network, a connectionless [, such as the Internet,] type network, personal computer communications, etc. are mentioned, for example.

[0024] With the above-mentioned composition, even if there are few communication devices of a call origination side and a called party, two circuits and connection are possible. The user by the side of call origination performs a direct file with easy operation using one certain circuit. Thus, ***** can be started, if a direct file is performed first and the partner who called will answer it, while it is connectable by easy operation (only usual and dial operation).

[0025] If communication by this direct file is started, at least one side of the communication device of a call origination

side and a called party will supervise direct file time. And when direct file time exceeds the above-mentioned setup time, connection with the communications partner which went via communication networks, such as the Internet, using another circuit is made, maintaining the present direct file and continuing communication. Furthermore, after succeeding in the connection via a communication network, it switches to the communication via a communication network from direct communication, and the circuit of a direct file is cut. Thus, since a switch is performed to the communication via a communication network from direct communication where [of a direct file and the connection via a communication network] a topology is both established, way piece ***** does not have communication. And easy operation for a direct file is only performed as mentioned above, and from a direct file, it is automatic to the communication via a communication network with cheap long distance phonecall charges, and changes to it, and the complicated operation and the complicated latency time accompanying the communication via a communication network are unnecessary entirely.

[0026] In addition, on the contrary, when communication time is short, although what telex-rate gold also becomes high is considered (since a partner is [city telex-rate gold] also needed), the direction via a communication network By restricting, when a direct file continues only the time set up beforehand in this system, and the change via a communication network occurring, and setting up the setup time concerned appropriately according to an accounting system If communication time is comparatively short, the above-mentioned change will not be generated but a communication mode with cheaper telex-rate gold will be automatically chosen as a result according to communication time. That is, a user will only do direct file operations (dial operation etc.), without being conscious of a communication network, and will use the communication mode of telex-rate gold which becomes cheap as a result.

[0027] Moreover, the network communication system concerning invention of a claim 2 is telephone equipment with which the communication device of the above-mentioned call origination side and a called party has a telephone call function in the composition of invention according to claim 1, and it is characterized by using above-mentioned one circuit for a direct telephone call (the usual telephone), and using the circuit of above-mentioned another side for the telephone call via a communication network (an Internet telephone or computer call service in personal computer communications). In addition, above telephone equipment is realizable not only by the telephone which has a headset but a microphone and a computer with a loudspeaker.

[0028] Thus, by applying the above-mentioned communication device as telephone equipment, only by dial operation of the telephone number, the telephone call via communication networks, such as an Internet telephone, can be performed as if it was carrying out the usual telephone, and the same operation and effect as invention of the above-mentioned claim 1 can be expected.

[0029] Moreover, the network communication system concerning invention of a claim 3 is characterized by the communication device of the above-mentioned call origination side and a called party being network connection equipment for connecting single terminal units (personal computer etc.) or a single Local Area Network (LAN) to a communication network in the composition of invention according to claim 1. In addition, the above-mentioned network connection equipment can be built in the terminal unit concerned, when connecting a single terminal unit to a communication network (it realizes as software of a personal computer, or realizes as an intelligent communication board), and when connecting LAN to a communication network, it can be constituted as a router.

[0030] Thus, by applying the above-mentioned communication device as network connection equipment, only by easy operation of a direct file, Internet VPN etc. can be constituted easily and the same operation and effect as invention of the above-mentioned claim 1 can be expected.

[0031] Moreover, the network communication system concerning invention of a claim 4 In the composition of invention according to claim 3 at least one side of the communication device of the above-mentioned call origination side and a called party Instead of the above-mentioned connect-time surveillance means, the communication amount of data after a direct file start with a communications partner is supervised. It has an amount-of-data surveillance means to detect that the amount of data concerned reached preset value, and is characterized by replacing the connection via a communication network by the above-mentioned communication network connecting means with the above-mentioned connect-time surveillance means, and performing it based on the above-mentioned detection result of an amount-of-data surveillance means.

[0032] Thus, when the communication device of a network communication system performs amount-of-data surveillance instead of connect-time surveillance in the case of network connection equipments, such as a router, and the communication amount of data after a direct file start with a communications partner reaches preset value The same operation and effect as invention according to claim 3 are expectable by making connection with the communications partner which went via communication networks, such as the Internet, using another circuit, maintaining the present direct file and continuing communication.

[0033] Moreover, it is characterized by equipping the network communication system concerning invention of a claim

5 with a notice means to notify the self identification information added to the communication data with which at least one side of the communication device of the above-mentioned call origination side and a called party went via the communication network in the composition of invention according to claim 1, 2, 3, or 4 to a communications partner into a direct file with a communications partner. In addition, the above-mentioned identification information is the address (IP address) of the Internet, the identification code of personal computer communications, etc.

[0034] As mentioned above, since at least one side of the communication device of a call origination side and a called party notifies self identification information, such as an IP address, to a communications partner into a direct file, even if a partner's identification information is not known at the time of a communication (telephone call) start, it becomes connectable [a communication network course] in a direct file.

[0035] Moreover, it is characterized by the network communication system concerning invention of a claim 6 being what acquires the address as identification information each time when the communication device of the above-mentioned called party makes dialup connection in the composition of invention according to claim 5 to the Internet which is a communication network.

[0036] Thus, by this invention, although communication which went via the communication network besides relaying the server prepared on the communication network (Internet) was not completed in the former when a called party was dialup connection, since a notice means according to claim 5 shows the IP address of a communications partner, it is not necessary to relay the server prepared on the communication network (Internet). Therefore, while the costs which communication takes are further reducible, it is not concerned with confusion of a server but communication becomes certainly possible.

[0037]

[Embodiments of the Invention]

[Gestalt 1 of operation] It is as follows when one gestalt of operation of this invention is explained based on drawing 1 or drawing 12.

[0038] The gestalt of this operation explains Internet telephone equipment. Although there are various gestalten in the Internet telephone equipment (communication device of a network communication system) concerning the gestalt of this operation like the after-mentioned, the case where the Internet telephone machine (it is usually one apparatus of a telephone and an Internet telephone) which gave the Internet telephone function to the usual telephone is used first is illustrated and explained.

[0039] The communication system which used the above-mentioned Internet telephone machine 1-1 for drawing 1 is shown. Here, in order to distinguish a called party a call origination side, the reference mark of the Internet telephone machine 1 which serves as 1a and a called party in the reference mark of the Internet telephone machine 1 which becomes a call origination side if needed is indicated as 1b. In addition, in each Internet telephone machine 1, the function of both a call origination side and a called party possesses, and all may become a call origination side and a called party.

[0040] Call origination of each Internet telephone machine 1 is carried out to a dial-up line network (the telephone line is only called hereafter) by the input of the partner point telephone number by dial operation, and it can notify the telephone number of the partner point to the exchange of the telephone line. Thereby, a digital circuit or analog networks, such as ISDN, are used for each Internet telephone machine 1, mutually, a partner is called and it can carry out direct communication of him.

[0041] Moreover, each Internet telephone machine 1 shown in drawing 1 has joined Internet access provider (provider) 3, and can use the Internet 4 as a communication network by dialup connection. In addition, since each Internet telephone machine 1 may become the case where it is on a call origination side, and a called party, the same function is required of the provider 3 whom they have joined.

[0042] A provider 3 makes ID which shows account (use qualification), and the password beforehand set up for every ID specifically input, when a connection request is received from the Internet telephone machine 1 through the telephone line. After collating with account and a password finishes, a provider 5 assigns one of the IP addresses which have **ed of two or more addresses (IP address) which oneself holds as an extraordinary IP address of the Internet telephone machine 1 concerned. Thereby, the Internet telephone machine 1 can recognize its IP address at the time of the present connection. Consequently, the Internet telephone machine 1 creates the data stream (datagram) divided for every predetermined size, and it can send out to a provider 3 or it can discriminate the datagram of ***** among the datagram received from the provider 3. A provider 3 transmits the datagram from the Internet telephone machine 1 to the Internet 4, and sends out the datagram from the Internet 4 to the Internet telephone machine 1. Thereby, even if the Internet telephone machine 1 does not have a peculiar IP address, it is connectable with the Internet 4.

[0043] Thus, the provider 3 is sharing the IP address, the connection circuit with the Internet 4, etc. among the subscribers by dialup connection. Therefore, in the provider 3, the connection fees of dialup connection are set up in

many cases at a low price compared with the case of a leased circuit connection, when the Internet telephone machine 1 holds a peculiar IP address and has always connected with the Internet 4 through the communication line of exclusive use.

[0044] Moreover, the provider 3 has one or more access points, in order to communicate with the Internet telephone machine 1 through the telephone line, a CATV (CATV) circuit, etc. The subscriber to a provider 3 can stop rental fees (phonecall charges), such as the telephone line at the time of communicating with a provider 3, for within the limits which can talk over the telephone by the local office number at a low price by choosing the access point prepared in the neighborhood.

[0045] Now, the Internet 4 is spreading widely and many providers have started service. If many of these providers install so that both communications which went via the direct communication and the Internet 4 which minded the telephone line for the Internet telephone machine 1 which is supporting dialup connection and is explained in full detail next may be attained, it is possible to build the communication system concerning this operation form easily.

[0046] Next, the composition of the Internet telephone machine 1 is explained.

[0047] The above-mentioned Internet telephone machine 1 can connect at least two communication lines simultaneously so that direct communication through the telephone line with a communications partner and communication which went via the Internet 4 can be simultaneously performed between place commuter's tickets. Although two or more line connection forms for realizing this are considered like the after-mentioned, as shown in drawing 2, ISDN which is a simultaneous usable digital circuit about two circuits (B channel) is used for them as the above-mentioned telephone line, and they illustrate and explain the form which connected the Internet telephone machine 1 to the day DETARU Data Circuit Terminating Equipment (DSU:Digital Service Unit) 2 here.

[0048] As shown in drawing 3, the above-mentioned Internet telephone machine 1 possessed TA (Terminal Adaptor) function, and is equipped with the S/T point interface (I/F) 11. Moreover, CPU12 by which the Internet telephone machine 1 controls the whole telephone concerned (Central Processing Unit), ROM13 the program of operation etc. is remembered to be (Read Only Memory), RAM14 used as the storage region for work (Random access Memory), The transmitter/receiver part 15 possessing the microphone and the loudspeaker, and the amplifier 16 which amplifies the I/O signal from a transmitter/receiver part 15, A/D and the D/A-conversion section 17 which changes the output to amplifier 16 into an analog while changing the analog input from amplifier 16 into digital one, It has the I/O sections 18, such as an operation button and an indicator, and I/O control unit (I/O) 19 which performs input/output control to this I/O section 18. Furthermore, the Internet telephone machine 1 is equipped also with the nonvolatile memory in which rewriting for memorizing the various set points, such as the telephone number of a provider's 3 access point, is possible.

[0049] Based on instructions of CPU12, a setup/cutting of a call (a line connection/cutting) are controlled, or above-mentioned S/T point I/F11 has the function to change mutually the data stream which CPU12 processes, and the electrical signal transmitted in an ISDN top. Moreover, based on the receipt information inputted through the operation button input of the I/O section 18, or above-mentioned S/T point I/F11, the above CPU 12 performs the predetermined program in ROM13, and performs various kinds of communications control processings.

[0050] In addition, with the form of this operation, the connect-time surveillance means, the communication network connecting means, change means, and notice means of a publication are realized by the claim by CPU12 which performs the predetermined program in the above ROM 13.

[0051] Next, operation of the outline of the communication system which used the above-mentioned Internet telephone machine 1 is explained based on drawing 1, drawing 4, or drawing 6.

[0052] First, as shown in drawing 4, it talks over the telephone a call origination side directly the telephone (here one B channel of ISDN) usual in between called parties, i.e., the telephone line, was minded by the usual dial of call origination side Internet telephone machine 1a ("1. voice" in drawing 1).

[0053] And if the above-mentioned direct duration of a call reaches at the time set up beforehand, a dialup start demand signal will be transmitted to called party Internet telephone machine 1b from call origination side Internet telephone machine 1a during a direct telephone call. Answering this, called party Internet telephone machine 1b answers call origination side Internet telephone machine 1a in a dialup start O.K. signal ("2. dialup demand, a response" in drawing 1).

[0054] Next, continuing under the direct telephone call by the above-mentioned usual telephone, as shown in drawing 5, a call origination side and the both sides of called party Internet telephone machine 1a and 1b use a vacant circuit (here B channel of another side of ISDN), and make dialup connection to each provider 3 ("3. dialup" in drawing 1). Thereby, a call origination side and the both sides of called party Internet telephone machine 1a and 1b acquire an IP address from each provider 3 ("4. IP address" in drawing 1).

[0055] And usually continuing under the direct telephone call by the telephone, a call origination side and a called

party put the IP address acquired, respectively on voice, and connect it to the other party. In addition, if the unknown episode is required of a subsequent Internet telephone, a cryptographic key will also be connected to the other party with the above-mentioned IP address ("5. IP address, the cryptographic key" in drawing 1). Since it will be in the state where a call origination side and the both sides of called party Internet telephone machine 1a and 1b were connected to the Internet 4 by this operation, and a partner's IP address has been recognized, an Internet telephone is possible. [0056] Then, as shown in drawing 6, during the direct telephone call by the telephone, a call origination side and the both sides of called party Internet telephone machine 1a and 1b are automatic to an Internet telephone, change to it, and usually disconnect a telephone. And a telephone call is continued by the Internet telephone after that ("6. voice" in drawing 1). In addition, the unknown episode on the Internet is possible using the cryptographic key usually connected in this case at the time of a telephone.

[0057] As mentioned above, in the communication system which used the Internet telephone machine 1, a user only does the usual dial, and it is automatic to the cheap Internet telephone of long distance phonecall charges, and changes to it, and the latency time required for the operation accompanying an Internet telephone or connection of an Internet telephone is unnecessary.

[0058] In addition, when duration of a call is short, although what phonecall charges also become high is considered on the contrary (since a partner is [a city call charge] also needed), the direction of an Internet telephone It restricts, when the direct telephone call by the telephone line continues only the time set up beforehand in this Internet telephone machine 1. Usually, by the change to an Internet telephone from a telephone occurring, and setting up the setup time concerned appropriately according to an accounting system If duration of a call is comparatively short, the change to an Internet telephone will not be generated but a telephone call method with cheaper phonecall charges will be automatically chosen as a result according to duration of a call. That is, a user will only do the usual telephone operation (dial operation), without being conscious of an Internet telephone, and will talk over the telephone as a result by the telephone call method of phonecall charges which becomes cheap.

[0059] Next, more detailed operation of the communication system which used the above-mentioned Internet telephone machine 1 is explained based on the flow chart of drawing 7 and drawing 8.

[0060] Before the beginning of using of the Internet telephone machine 1, the telephone number of a provider's 3 access point, the account for collating to a provider 3 and a password, the area code (their area code) of the area which uses the Internet telephone machine 1 concerned, and time until it usually changes from a telephone to an Internet telephone are set as the Internet telephone machine 1. This set point is memorized by the nonvolatile memory of the Internet telephone machine 1, and is referred to during communication operation. In addition, whenever it will talk over the telephone as long as there is no change after that once it sets up, it is not necessary to set up the above-mentioned set point. Of course, a part of set points or all set points, such as a password, can be changed if needed.

[0061] first, the user of call origination side Internet telephone machine 1a to whom the above-mentioned setup was given beforehand dials and does call origination of a partner's telephone number (step 1a of drawing 7) -- thereby, called party Internet telephone machine 1b is called through the telephone line (here one B channel of ISDN) (step 1b) In addition, below, step 1a is called for short like S1a. Moreover, a is shown in a tail like S1a, for processing which called party Internet telephone machine 1b performs, b is added to a tail like S1b, and both operation is distinguished at processing which call origination side Internet telephone machine 1a performs.

[0062] In the above, if the user of called party Internet telephone machine 1b answers a call, the direct telephone call by the telephone will usually be started.

[0063] In the above-mentioned call origination side Internet telephone machine 1a, the telephone number of the partner to whom CPU12 of drawing 3 was dialed contains to area code (further country code), and it judges whether the area code is its area code (S2a). Since it is a city call when it judges with NO here, the change to an Internet telephone will be unnecessary and a telephone will usually be continued after that.

[0064] On the other hand, since it is a long distance call or an overseas call in the above-mentioned S2a in YES, measurement of duration of a call is started for the change to the Internet telephone according to duration of a call (S3a). In addition, although call origination side Internet telephone machine 1a is supervising direct duration of a call here, it is not limited to this but either [a call origination side and / at least] called party Internet telephone machine 1a or 1b should just supervise direct duration of a call. Here, if a telephone call is completed before the time set up beforehand comes, the change to an Internet telephone will not be generated. On the other hand, when fixed time beforehand set up after the duration-of-a-call measurement start is passed, change operation to the following Internet telephones will be started.

[0065] That is, after checking the opening of a circuit (here B channel of another side of ISDN) other than the circuit currently used for the present direct telephone call, call origination side Internet telephone machine 1a puts a dialup start demand signal on the sound signal under present telephone call, and transmits to called party Internet telephone

machine 1b (S4a). For example, a dialup start demand signal is transmitted within the frequency band of a circuit using the band which does not become jarring even if superimposed on voice.

[0066] Or you may make it the transceiver sound of the signal for change operation to Internet telephones, such as the above-mentioned dialup start demand signal, heard from the loudspeaker of an earphone. If it does in this way, a user can recognize that change operation to an Internet telephone was started.

[0067] On the other hand, the above-mentioned dialup start demand signal is answered from a call origination side, a dialup start O.K. signal is put on the sound signal under present telephone call, and called party Internet telephone machine 1b also answers call origination side Internet telephone machine 1a, after checking the opening of a circuit (here B channel of another side of ISDN) other than the circuit currently used for the present direct telephone call (S2b).

[0068] In addition, if call origination side Internet telephone machine 1a cannot receive the above-mentioned dialup start O.K. signal, a called party judges with it not being an Internet telephone machine (or another circuit of a called party not being vacant), and does not perform change operation to a subsequent Internet telephone, but the present usual telephone is continued (being S5a NO). On the other hand, when there is a reply of the dialup start O.K. signal from a called party (it is YES at S5a), though the present direct telephone call is continued, call origination side Internet telephone machine 1a uses vacant another circuit, and makes dialup connection to a provider 3 (S6a).

[0069] Moreover, the above-mentioned called party Internet telephone opportunity 1b also uses vacant another circuit after the reply of the dialup start O.K. signal in S2b, and makes dialup connection to a provider 3 (S3b).

[0070] Then, if either [a call origination side and] called party Internet telephone machine 1a and 1b are not connectable with a provider 3, the side which has not been connected notifies a partner of that and continues the present usual telephone (being S7a and/or S4b NO). On the other hand, if a call origination side and the both sides of called party Internet telephone machine 1a and 1b connect with a provider 3 and acquire an IP address (it is YES at S7a and S4b), if needed [self / IP address and if needed], a cryptographic key will be put on the sound signal under present telephone call, and it will transmit to each other to the other party (S8a and S5b of drawing 8).

[0071] Then, Internet telephone machine 1a and 1b of a call origination side and a called party acquire the IP address and cryptographic key of the other party, respectively (S9a and S6a). Next, call origination side Internet telephone machine 1a transmits a test data to called party Internet telephone machine 1b by Internet 4 course (S10a), and called party Internet telephone machine 1b which received it answers call origination side Internet telephone machine 1a in a test data by Internet 4 course (S7b). Here, if there is no reply of the test data from a called party into a predetermined time (it is NO at S11a), call origination side Internet telephone machine 1a will judge that the circuit state of Internet 4 course is bad, will cut connection with a provider 3, and will connect that also to a called party through the circuit under direct telephone call. In this case, called party Internet telephone machine 1b will also cut connection with a provider 3, and a telephone will usually be continued after that.

[0072] In the above-mentioned S11a, if the reply of the test data from a called party is in a predetermined time, call origination side Internet telephone machine 1a will superimpose the Internet change signal on the voice under present telephone call, and will transmit to a called party (S12a). And call origination side Internet telephone machine 1a usually changes the voice input/output to the transmitter/receiver part 15 of drawing 3 from a telephone to an Internet telephone (S13a). Moreover, called party Internet telephone machine 1b which received the Internet change signal from the call origination side usually changes (S8b) and the voice input/output to a transmitter/receiver part 15 from a telephone to an Internet telephone similarly (S9b). Thereby, the telephone call by the Internet telephone is started between called parties a call origination side.

[0073] In addition, since each of telephones and Internet telephones has usually changed I/O of a transmitter/receiver part 15 in the possible state in the case of the change to an Internet telephone from the above-mentioned usual telephone, even if it is in the middle of a telephone call, a comparatively smooth change is possible and it does not have big influence on a telephone call.

[0074] If a telephone call according to an Internet telephone as mentioned above is started, call origination side Internet telephone machine 1a will usually cut connection of a telephone (S14a), and the telephone call by the Internet telephone will be continued after that.

[0075] Then, when closing the telephone call by the Internet telephone, the signal of ***** is outputted to a partner by Internet 4 course (S15a or S10b), and call origination side and called party Internet telephone machine 1a and 1b cut connection with a provider 3 (S16a and S11b).

[0076] By the way, after changing to an Internet telephone, in order to prevent tapping, it is desirable to encipher information using a cryptographic key. On the occasion of encryption, the call origination side and the called party need to recognize the cryptographic key to be used. Although it thinks when both sides can already recognize the cryptographic key before a telephone call, when changing the case where that is not right, and a cryptographic key, it is

necessary to notify a cryptographic key between called parties a call origination side. Then, a cryptographic key can be notified comparatively safely by putting at voice during the telephone call which can expect the privacy of a telephone call usually according to a telephone, and transmitting a cryptographic key to the other party as mentioned above. [0077] Here, any of the method which a public key and private keys, such as RSA, have separated, and the method which uses a private key (common key) common on both sides are sufficient as the cipher system to be used. Moreover, in the above-mentioned explanation, although each called party has notified the partner of the cryptographic key the call origination side, when using a common private key especially on both sides, only either should notify a cryptographic key to another side. Of course, if it is the telephone call which does not need privacy, it is unnecessary, and encryption can expect improvement in the speed of the part processing, and connection of a cryptographic key is also unnecessary [encryption].

[0078] Moreover, although IP addresses are exchanged on a call origination side and the both sides of a called party in the above-mentioned explanation, as for the telephone call on the Internet 4, it is also possible for either to connect an IP address to another side. That is, if the side which received the notice of an IP address from the partner transmits IP packet to the partner through the Internet 4, since the source (sending agency) address and the destination (destination) address are set to the header of the IP packet, the partner who received the IP packet concerned is because the IP address of a sending agency is acquirable at the time.

[0079] Moreover, you may use this system instead of putting on voice like the above-mentioned explanation, and exchanging IP addresses now by the IP address inquiry system by the server for IP address management installed on the Internet 4, since the method of acquiring a partner's IP address also exists.

[0080] Moreover, although the communication test (S10a, S11a, and S7b of drawing 8) is performed in the above-mentioned explanation at the time of connection with the Internet 4, it is not indispensable and this can also be omitted.

[0081] Moreover, during a telephone call, the following two operations are also possible. One of them is operation which usually starts the change to an Internet telephone compulsorily during the telephone call by the telephone. This is operation performed when a user is ** conscious to a long telephone and telephones from the beginning, and becomes possible by predetermined operation in the I/O section 18 of drawing 3. Another is usually compulsive change operation to a telephone from an Internet telephone. It is the operation performed when a user judges that this has a problem in the voice quality of an Internet telephone, and becomes possible by predetermined operation in the I/O section 18 of drawing 3 too.

[0082] Moreover, although the above-mentioned explanation explained the operation gestalt of one apparatus shown in drawing 2, as other gestalten, the gestalt shown in drawing 9 or drawing 12 can be considered.

[0083] First, the gestalt of drawing 9 is the coalesced type of the usual analog telephone 10 and the Internet telephone machine BOX 11 (what made DSU serve a double purpose), and has connected the Internet telephone machine BOX 11 to ISDN. In this case, the Internet telephone machine BOX 11 will usually perform above-mentioned communications controls, such as a change to a telephone and an Internet telephone.

[0084] Moreover, the gestalten of drawing 10 are a microphone and a performed type in the computer 12 with a loudspeaker, and have connected the computers 12, such as a personal computer, to DUS14 of ISDN through a terminal adapter (TA) 13. In this case, usually, above-mentioned communications controls, such as a change to a telephone and an Internet telephone, are realized, when the computer 12 concerned performs software stored in the memory of a computer 12.

[0085] Moreover, too, although the gestalten of drawing 11 are a microphone and a performed type in the computer 12 with a loudspeaker, they have connected two analog telephone lines to a computer 12 with this gestalt. Since one analog telephone line is for connecting with the Internet 4 as mentioned above, it is using the modem 15. Since the analog telephone line of another side is an object for a direct telephone call, especially the modem 15 etc. is unnecessary. In addition, the equipment (not shown) possessing the function to separate a dialup start demand signal etc. from the function and voice for superimposing a dialup start demand signal etc. on voice is also connectable with the analog telephone line for a direct telephone call (of course, it is also possible to give the function concerned in a computer 12).

[0086] Moreover, the gestalt of drawing 12 is the example of the hybrid connection between a CATV (CATV) circuit and the telephone line (an analog or digital circuit), and an Internet telephone machine [or], a microphone, or a computer with a loudspeaker can realize it. In order to connect an Internet telephone machine or a computer, and each circuit, a modem (or DSU) 17 is used for a cable modem 16 by the CATV circuit, and is used for the telephone line.

[0087] Of course, a CATV circuit can usually be used as the circuit for a telephone, and a circuit for Internet telephones.

[0088] Although not illustrated, it is also possible to give the same function as the above-mentioned Internet telephone

machine 1 to the portable telephone (or computer) which has two or more Radio Communications Department. Furthermore, the gestalt which connects a microphone and carried type computers with a loudspeaker (notebook sized personal computer etc.) to the ISDN port of an ISDN public telephone machine is also considered. [0089] Moreover, following various methods can be considered during a telephone call at voice also besides superimposing required information like the above-mentioned explanation as a method of connecting against dialup connection timing or an IP address.

[0090] One of them is the method of performing the notice of information using the D channel packet communication, when using ISDN. If this method is used, the line connection by B channel present in use is another root, and an IP address etc. can be transmitted, without affecting a telephone call in any way. In addition, the contract for a call origination side and a called party using the D channel packet to an ISDN entrepreneur in this case is required.

[0091] Moreover, 3 person telephone call service which is called ISDN FUREKKUSUHON and trio phone (all are the service names of NTT (Nippon Telegraph and Telephone CORP.)) of an analog telephone line is offered now, and an IP address etc. can be transmitted using this service. With the above-mentioned 3 person telephone call service, it is the service which can set up other partners and another call simultaneously like ISDN FUREKKUSUHON like the service in which two partners and a telephone call are possible, or a trio phone, with a call with a partner suspended. If circuit (namely, circuit for making dialup connection at a provider 3) with the another circuit for a direct telephone call has 3 person telephone call functions, information, such as an IP address, can be transmitted to a partner, telephoning a telephone partner directly by the circuit which has the 3 person telephone call functions concerned, and maintaining connection with a provider 3.

[0092] Moreover, an IP address can also be connected to a partner by Internet 4 course using an E-mail. A provider 3 is also the mail server of the Internet telephone machine 1 of drawing 1. Specifically, the provider 3 has assigned the e-mail address beforehand to the Internet telephone machine 1, and has the storage region (mail box) corresponding to this which is not illustrated. The E-mail of Internet telephone machine 1 ** is delivered to a provider 3, the E-mail of Internet telephone machine 1 ** is received, and a provider 3 accumulates it to a corresponding mail box. It always connects with the Internet 4 and the provider 3 of the IP address is always fixed. Therefore, it is not concerned with the IP address at whether the Internet telephone machine 1 is connected to the Internet 4, and the time of connection, but an E-mail is delivered certainly. When each Internet telephone machine 1 makes dialup connection, it can read the E-mail of ***** from the above-mentioned mail box.

[0093] Then, it transmits to the e-mail address of the partner point by making an IP address into an E-mail. In this case, the Internet telephone machine 1 is a predetermined period, and if its mail box prepared for the provider 3 is supervised and the E-mail from a partner arrives, for example, a 5-second interval etc. will read the E-mail concerned from the above-mentioned mail box, and it will acquire an IP address for it. In addition, this method is not applicable to connection of dialup connection timing.

[0094] Moreover, although the above-mentioned explanation is the thing of an about when each of call origination sides and called parties makes dialup connection, automatic-switching operation to an Internet telephone from the above-mentioned usual telephone is [the topology connected with the Internet 4 in the dedicated line] effective [the Internet telephone machine 1]. In addition, in the case of a leased connection, it is [be / unnecessary / the process of the dialup connection with a provider 3] needless to say in a bird clapper.

[0095] Therefore, the automatic-switching method from the usual telephone of the form of this operation to an Internet telephone can apply either of the following four forms.

- (1) The form whose called party a call origination side is a dialup Internet connectivity, and is also a dialup Internet connectivity.
- (2) The form whose called party a call origination side is a dedicated line Internet connectivity, and is a dialup Internet connectivity.
- (3) The form whose called party a call origination side is a dialup Internet connectivity, and is a dedicated line Internet connectivity.
- (4) The form whose called party a call origination side is a dedicated line Internet connectivity, and is also a dedicated line Internet connectivity.

[0096] Also of the four above-mentioned forms, the method of the form of this operation is effective especially in the form of (1) and (2) whose called party is a dialup Internet connectivity. It is because the latency time [need / to be operated / in connection with / if it is because the IP address of a called party is not known by the call origination side before the start of a telephone if the called party of it is a dialup Internet connectivity and the method of the form of this operation also in such the state is applied, will only carry out a dial usual to a partner as mentioned above, and / an Internet telephone / for an Internet telephone] is also unnecessary and a telephone rate also becomes cheap as a result. [0097] Moreover, it is because it changes to an Internet telephone only by carrying out the usual dial to a partner and

the same effect as the form of (1) and (2) is acquired that the method of the form of this operation is effective also in the form of (3) and (4) whose called party is a dedicated line Internet connectivity. Moreover, it changes to an Internet telephone only by carrying out the usual dial to a partner, if it does not restrict that the user by the side of call origination knows the IP address of a called party and the IP address of a called party is not known, even if a called party is a dedicated line Internet connectivity, and the same effect as the form of (1) and (2) is acquired too.

[0098] In addition, when the IP address fixed from the public engine in advance is acquired, the process which acquires an IP address from a provider 3 can be skipped. Moreover, specification by the "domain name" is also possible instead of an IP address. This is because the IP address corresponding to it is acquirable from a domain name by using the Domain Name System (DNS) which consists of domain name servers formed on the Internet 4.

[0099] Moreover, although the above-mentioned explanation explained the change to the Internet telephone which went via the Internet 4, it is applicable not only to the Internet 4 but the computer call service in personal computer communications. Namely, what is necessary is just to usually perform the change to the computer call service in personal computer communications from a telephone like automatic switching to an Internet telephone from an above-mentioned usual telephone, when using personal computer communications instead of the Internet 4.

[0100] If the call origination side and the called party have joined personal computer communications and you will telephone to a neighboring access point, a call origination side and the both sides of a called party can log in to a personal-computer-communications server. The above-mentioned personal-computer-communications server communicates with a call origination side and a called party, for example, database reference etc. not only offers predetermined service, but can relay communication between called parties a call origination side. Thereby, a call origination side and a called party can communicate bidirectionally via a personal-computer-communications server instead of going via the Internet 4.

[0101] Generally, when the subscriber is managed by identification code (ID) etc. and a subscriber connects through the telephone line, a personal-computer-communications server collates ID and a password, and discriminates each subscriber. Therefore, when using personal computer communications instead of the Internet 4, the identification code (ID) of personal computer communications will be used instead of an IP address.

[0102] [Gestalt 2 of operation] It is as follows when one gestalt of operation of others of this invention is explained based on drawing 13 or drawing 24.

[0103] The gestalt of this operation explains the Internet VPN contact (an Internet connectivity machine is called hereafter) as an example of network connection equipment. Although an Internet connectivity machine is equipment for connecting between computers via the Internet and there are various gestalten like the after-mentioned, the Internet connectivity machine first used as a router for remote connection which connects the terminal on LAN to the Internet is explained.

[0104] The communication system which used the above-mentioned Internet connectivity machine 21-21 for drawing 13 is shown. Here, in order to distinguish a called party a call origination side, the reference mark of the Internet connectivity machine 21 which serves as 21a and a called party in the reference mark of the Internet connectivity machine 21 which becomes a call origination side if needed is indicated as 21b. In addition, in each Internet connectivity vessel 21, the function of both a call origination side and a called party possesses, and all may become a call origination side and a called party.

[0105] The above-mentioned Internet connectivity machine 21 is connected on LAN22 with the computer 20. When the computer 20 on LAN22 inputs the partner point telephone number and it performs communication with the partner besides LAN22 concerned, call origination of the Internet connectivity machine 21a on LAN22 is carried out to the telephone line, and it can carry out direct communication with a partner's Internet connectivity machine 21b. Moreover, the Internet connectivity machine 21 has joined the provider 3, and can use the Internet 4 by dialup connection.

[0106] Next, the composition of the Internet connectivity machine 21 is explained.

[0107] The above-mentioned Internet connectivity machine 21 can connect at least two communication lines simultaneously so that direct communication through the telephone line with a communications partner and communication which went via the Internet 4 can be simultaneously performed between place commuter's tickets. Although two or more line connection gestalten for realizing this are considered like the after-mentioned, as shown in drawing 20, simultaneous usable ISDN is used for them for two circuits (B channel) as the above-mentioned telephone line, and they illustrate and explain the gestalt which connected the Internet connectivity machine 21 to the DSU2 here.

[0108] The above-mentioned Internet connectivity machine 21 of other fundamental hard composition is the same as the above-mentioned Internet telephone machine 1, although it differs in that it has the LAN interface (I/F) 23 instead of the transmitter/receiver part 15 of the Internet telephone machine 1 in the gestalt 1 of the aforementioned implementation, amplifier 16, and A/D and the D/A-conversion section 17 (refer to drawing 3) as shown in drawing

14. However, CPU12 of the Internet connectivity machine 21 cannot be overemphasized by having the various functions which are not in the Internet telephone machines 1, such as a routing function. Moreover, the Internet connectivity machine 21 is equipped also with the nonvolatile memory in which rewriting for memorizing the various set points, such as the telephone number of a provider's 3 access point, is possible.

[0109] Next, operation of the outline of the communication system which used the above-mentioned Internet connectivity machine 21 is explained based on drawing 13, drawing 15, or drawing 17.

[0110] In addition, on the occasion of the following explanation, the IP address of the computer 20 on "a0.a1.a2.a3" and LAN22 concerned is set to "a0.a1.a2.a4" for the IP address of Internet connectivity machine 21a on LAN22 by the side of call origination. These IP addresses are not the formal IP address acquired from the public engine but effective local private IP addresses only on LAN22 by the side of call origination.

[0111] Moreover, the IP address of the computer 20 on "b0.b1.b2.b3" and LAN22 concerned is set to "b0.b1.b2.b4" for the IP address of Internet connectivity machine 21b on LAN22 of a called party. These IP addresses are also effective local private IP addresses only on LAN22 of a called party.

[0112] First, as shown in drawing 15, it is IP:a0.a1.a2.a4 on LAN22 by the side of call origination. A computer 20 IP:b0.b1.b2.b4 on LAN22 of the called party in a remote place If the frame which requires communication with a computer 20 is sent out to LAN22 by the side of call origination Call origination side Internet connectivity machine 21a carries out call origination by the usual dial to called party Internet connectivity machine 21b, and performs the direct file through the telephone line (here one B channel of ISDN) ("1. data" in drawing 13). Thereby, it is IP:a0.a1.a2.a4. A computer 20 and IP:b0.b1.b2.b4 The data communication by the direct file becomes possible between computers 20.

[0113] And if it reaches at the time when the above-mentioned direct communication time was set up beforehand, a dialup start demand signal will be transmitted to called party Internet connectivity machine 21b from call origination side Internet connectivity machine 21a during direct communication. Answering this, called party Internet connectivity machine 21b answers call origination side Internet connectivity machine 21a in a dialup start O.K. signal ("2. dialup demand, a response" in drawing 13).

[0114] Next, continuing the above-mentioned direct file, as shown in drawing 16, a call origination side and the both sides of called party Internet connectivity machine 21a and 21b use a vacant circuit (here B channel of another side of ISDN), and make dialup connection to each provider 3 ("3. dialup" in drawing 13). Thereby, a call origination side and the both sides of called party Internet connectivity machine 21a and 21b acquire an IP address from each provider 3 ("4. IP address" in drawing 13).

[0115] And a call origination side and a called party connect the IP address (here, referred to as IP:d0.d1.d2.d3 a IP:c0.c1.c2.c3 and call origination side a call origination side) acquired, respectively to the other party, continuing a direct file. In addition, if cryptocommunication is required of the communication which went via the subsequent Internet 4, a cryptographic key will also be connected to the other party with the IP address acquired from the above-mentioned provider 3 ("5. IP address, the cryptographic key" in drawing 13). Since it will be in the state where a call origination side and the both sides of called party Internet connectivity machine 21a and 21b were connected to the Internet 4 by this operation, and a partner's formal IP address has been recognized by it, the communication (Internet VPN) which went via the Internet 4 is possible.

[0116] Then, as shown in drawing 17, into the above-mentioned direct file, a call origination side and the both sides of called party Internet connectivity machine 21a and 21b are automatic in the Internet VPN state, change, and cut a direct file. And the communication which went via the Internet 4 is continued after that ("6. data" in drawing 13). In addition, the cryptocommunication on the Internet is possible using the cryptographic key connected in this case at the time of a direct file.

[0117] In case communication which went via the above-mentioned Internet 4 is performed, call origination side and called party Internet connectivity machine 21a and 21b change as follows the source (sending agency) address and the destination (destination) address which are included in the header of IP packet, when the data (IP packet) which received from the computer 20 are sent out to the Internet 4, and when data are received from the Internet 4. Here, for example, for the sending agency address, IP:a0.a1.a2.a4 and a destination address are IP:b0.b1.b2.b4. IP packet is expressed as [IP:a0.a1.a2.a4 ->IP:b0.b1.b2.b4].

[0118] That is, at the time of data sending out in the Internet 4, a call origination side, Internet connectivity machine 21a changes IP packet of [IP:a0.a1.a2.a4 ->IP:b0.b1.b2.b4] into [IP:c0.c1.c2.c3 ->IP:d0.d1.d2.d3], and sends it out to the Internet 4. On the other hand, called party Internet connectivity machine 21b changes IP packet of [IP:b0.b1.b2.b4 ->IP:a0.a1.a2.a4] into [IP:d0.d1.d2.d3 ->IP:c0.c1.c2.c3], and sends it out to the Internet 4.

[0119] Moreover, at the time of the data reception from the Internet 4, a call origination side, Internet connectivity machine 21a changes IP packet of [IP:d0.d1.d2.d3 ->IP:c0.c1.c2.c3] into [IP:b0.b1.b2.b4 ->IP:a0.a1.a2.a4], and sends

it out to up to LAN22.

[0120] On the other hand, called party Internet connectivity machine 21b changes IP packet of [IP:c0.c1.c2.c3 ->IP:d0.d1.d2.d3] into [IP:a0.a1.a2.a4 ->IP:b0.b1.b2.b4], and sends it out to up to LAN22.

[0121] Even if it changes from a direct file to Internet VPN, communication is continuable as it is with IP address conversion of this Internet connectivity machine 21.

[0122] As mentioned above, it is only carrying out direct communication, and it is automatic to connection of Internet 4 cheap course of long distance phonecall charges, and changes [in the communication system which used the Internet connectivity machine 21 it is the computer 20 which connected the Internet connectivity machine 21 concerned, and a partner's telephone number is specified, and] to it, and the latency time required for the operation accompanying connection of the Internet 4 course concerned and its connection is unnecessary.

[0123] In addition, on the contrary, when duration of a call is short, although what telex-rate gold also becomes high is considered (since a partner is [city telex-rate gold] also needed), the direction of Internet 4 course By restricting, when a direct file continues only the time set up beforehand with this Internet connectivity vessel 21, and the change to Internet 4 course occurring, and setting up the setup time concerned appropriately according to an accounting system If communication time is comparatively short, the change to Internet 4 course will not be generated, but a communication mode with cheaper telex-rate gold will be automatically chosen as a result according to communication time. That is, without being conscious of connection with the Internet 4 in any way, a user will only perform a direct file with a partner, and will communicate as a result by the communication mode of telex-rate gold which becomes cheap.

[0124] More detailed operation of the communication system which used the above-mentioned Internet connectivity machine 21 is shown in the flow chart of drawing 18 and drawing 19 . In addition, a was shown in the tail like S21a, for processing which called party Internet connectivity machine 21b performs, b was added to the tail like S21b, and both operation is distinguished at processing which call origination side Internet connectivity machine 21a performs.

[0125] It is necessary to set the telephone number of a provider's 3 access point, the account for collating to a provider 3 and a password, the area code (one's area code) of the area which uses the Internet connectivity machine 21, and time until it changes from a direct file to Internet 4 course as the Internet connectivity machine 21 before a communicative start like the above-mentioned Internet telephone machine 1 (except for a setup by the side of LAN22). This set point is memorized by the nonvolatile memory of the Internet connectivity machine 21, and is referred to during communication operation. In addition, the above-mentioned set point of not setting up, whenever it will communicate as long as there is no change after that, once it sets up is the same as that of the point.

[0126] Processing S21b-31b of processing S21a-S36a and called party Internet connectivity machine 21b of call origination side Internet connectivity machine 21a shown in the flow chart of drawing 18 and drawing 19 is the same as that of processing S1a-S16a by the side of the call origination of the Internet telephone machine 1 shown in the flow chart of drawing 7 and drawing 8 , and processing S1b-11b of a called party fundamentally, and the detailed explanation is omitted. Both primary difference is what IP address conversion is performed for (S33a and S29b), when the local (it is private) IP address is used with the Internet connectivity vessel 21 at the time of a direct file and is changed to communication of Internet 4 course. In addition, although a dialup start demand signal and an IP address are put on telephone call voice in the Internet telephone machine 1 and are transmitted to the sound signal with it at the time of a direct telephone call The communication data between a call origination side and the called party computer 20.20 are not made lost with the Internet connectivity vessel 21 at the time of direct communication. IP:a0.a1.a2.a3 Call origination side Internet connectivity machine 21a and IP:b0.b1.b2.b3 Transmission and reception of a dialup start demand signal or an IP address are performed between called party Internet connectivity machine 21b.

[0127] Moreover, with the Internet connectivity vessel 21, since it is possible to measure the amount of data which flows to a communication line, you may measure the communication amount of data instead of the processing (namely, communication time measurement) by S23a of drawing 8 (generally, communication duration and the communication amount of data are in proportionality, and can expect the same result as communication time measurement). In this case, if the communication amount of data after a direct file start with a communications partner reaches preset value (a user setup is possible), it will shift to processing of S24a. Either [at least] call origination side Internet connectivity machine 21a or called party Internet connectivity machine 21b should just have this amount-of-data monitoring function (amount-of-data surveillance means).

[0128] By the way, like an Internet telephone, after changing to communication of Internet 4 course, in order to prevent tapping, it is desirable to encipher information using a cryptographic key. A cryptographic key can be notified comparatively safely by transmitting the cryptographic key used for encryption during the direct communication which can expect the privacy of a telephone call to the other party as above-mentioned.

[0129] Here, any of the method which a public key and private keys, such as RSA, have separated, and the method which uses a private key (common key) common on both sides are sufficient as the cipher system to be used.

Moreover, in the above-mentioned explanation, although each called party has notified the partner of the cryptographic key the call origination side, when using a common private key especially on both sides, only either should notify a cryptographic key to another side. Of course, if it is the telephone call which does not need privacy, it is unnecessary, and encryption can expect improvement in the speed of the part processing, and connection of a cryptographic key is also unnecessary [encryption].

[0130] Moreover, although IP addresses are exchanged on a call origination side and the both sides of a called party in the above-mentioned explanation, it is as above-mentioned for the telephone call on the Internet 4 to be possible also for either connecting an IP address to another side. Moreover, the method of acquiring a partner's IP address can be used by the IP address inquiry system by the server for IP address management installed on the Internet 4.

[0131] Moreover, although the communication test (S30a, S31a, and S27b of drawing 19) is performed in the above-mentioned explanation at the time of connection with the Internet 4, it is not indispensable and this can be omitted.

[0132] Moreover, although the above-mentioned explanation explained the router type operation form linked to ISDN as shown in drawing 20, as other forms, the form shown in drawing 21 or drawing 24 can be considered.

[0133] First, although the form of drawing 21 is a router type too, the circuit to be used is the mixed type of a CATV circuit and the telephone line (an analog or digital circuit), and a modem (or DSU) 17 is used for connection with a cable modem 16 and the telephone line by connection with a CATV circuit.

[0134] Moreover, the form of drawing 22 is a performed type in the independent computer 20 which is not connected on LAN, and has connected the computers 20, such as a personal computer, to DUS14 of ISDN through a terminal adapter (TA) 13. In this case, above-mentioned communications controls, such as a change to a direct file and Internet 4 course, are realized when the computer 20 concerned performs software stored in the memory of a computer 20.

[0135] Moreover, too, although the form of drawing 23 is a performed type in the independent computer 20, it has connected two analog telephone lines to a computer 20 through two modems 15-15 with this form.

[0136] Moreover, although the form of drawing 24 is a performed type in a computer 20 too, the circuit to be used is the mixed type of a CATV circuit and the telephone line (an analog or digital circuit), and a modem (or DSU) 17 is used for connection with a cable modem 16 and the telephone line like the form of drawing 21 by connection with a CATV circuit.

[0137] Of course, a CATV circuit can be used as the circuit for direct files, and a circuit of ** via the Internet.

[0138] Although not illustrated, it is also possible to give the same function as the above-mentioned Internet connectivity machine 21 to the carried type computers (notebook sized personal computer etc.) which have two or more Radio Communications Department. Furthermore, the form which connects a carried type computer to the ISDN port of an ISDN public telephone machine is also considered.

[0139] moreover, as a method of connecting against dialup connection timing or an IP address Also besides transmitting like the above-mentioned explanation and receiving an IP address etc. between a call origination side and a called party in a direct file using the circuit concerned which is carrying out the direct file When using the method explained with the form 1 of operation, i.e., ISDN There are a method of performing the notice of information using the D channel packet communication, a method of using 3 person telephone call service, and the method (only an E-mail is not applicable to connection of dialup connection timing) of using an E-mail.

[0140] Moreover, although the above-mentioned explanation is the thing of an about when each of call origination sides and called parties makes dialup connection, automatic-switching operation to the Internet 4 course from the above-mentioned direct file is [the topology connected with the Internet 4 in the dedicated line] effective [the Internet connectivity machine 21]. In addition, in the case of a leased connection, it is [be / unnecessary / the process of the dialup connection with a provider 3] needless to say in a bird clapper.

[0141] That is, the automatic-switching method to the Internet 4 of the form of this operation can apply either of four forms of (1) - (4) shown with the form 1 of the aforementioned implementation. Moreover, in the form of (1) and (2) whose called party is a dialup Internet connectivity, the method of the form of this operation is very effective too especially. If the method of the form of this operation is applied also in such the state, as mentioned above, if a called party is a dialup Internet connectivity, it will be because the IP address of a called party is not known by the call origination side before a communicative start, and it will only carry out the usual dial to a partner, and as for it, the operation accompanying connection of Internet 4 course and its latency time will be unnecessary, and it will be because a telephone rate also becomes cheap as a result. Moreover, it is because it changes to connection of Internet 4 course only by carrying out the usual dial to a partner and the same effect as the form of (1) and (2) is acquired that the method of the form of this operation is effective also in the form of (3) and (4) whose called party is a dedicated line Internet connectivity. Moreover, it changes to connection of Internet 4 course only by carrying out the usual dial to a partner, even if the user by the side of call origination does not know the IP address of a called party, and the same effect as the form of (1) and (2) is acquired too.

[0142] Moreover, when the IP address fixed from the public engine in advance is acquired, the process which acquires an IP address from a provider 3 can be skipped. Moreover, specification by the "domain name" is also possible instead of an IP address.

[0143] Moreover, the method of the form of this operation as well as the Internet telephone machine 1 of the form 1 of the aforementioned implementation is applicable not only to the Internet 4 but the computer call service in personal computer communications.

[0144] To the communication system of the form of this operation, various application software, such as for example, a network meeting, data retrieval, renewal of data, or a file transfer, is usable. For example, in a network meeting, partner another after changing to the 1st Internet VPN communication at the vacant communication channel (circuit which was being used for the direct file till then) can be called one after another, and the method of making it participate in the Internet VPN communication can realize many-to-many communication easily.

[0145] As mentioned above, the communication device of the network communication system concerning the forms 1 and 2 of this operation When a direct file means to carry out call origination to a communication terminal through a public line, and to connect possible [communication] with a partner directly, a connect-time surveillance means to supervise direct file time with a partner, and the time when the above-mentioned direct file time was set up beforehand are exceeded, Maintaining a direct file with the partner through the public line, and continuing communication The communication network connecting means connected possible [communication] with a partner via communication networks, such as the Internet 4 or a personal-computer-communications network It is characterized by having the means which cuts the connection which minded the public line after the connection success via this communication network, and is switched to the communication via a communication network. Thereby, a user only performs a direct file with a partner, and becomes connectable [the cheap communication network course of telex-rate gold] automatically, and the operation for connection via a communication network and latency time are also unnecessary.

[0146] Moreover, the correspondence procedure concerning the forms 1 and 2 of this operation When the step which connects directly the communication device by the side of call origination with the communication device of a called party possible [communication] through a public line, and the time when the direct file time through the above-mentioned public line was set up beforehand are exceeded, Maintaining the direct file concerned and continuing communication between called parties a call origination side The step which connects a called party possible [communication] a call origination side via a communication network, After the connection via the above-mentioned communication network is successful, it is characterized by including the step which cuts the direct file through the public line and is switched to the communication via a communication network, and the same effect as the above is acquired.

[0147] [Effect of the Invention] The network communication system concerning invention of a claim 1 As mentioned above, so that a direct file with a communications partner and connection with the communications partner which went via the communication network can be made simultaneously The communication device of the call origination side prepared possible [at least two circuits and connection] and a called party is included. at least one side of the communication device of the above-mentioned call origination side and a called party Direct file time with a communications partner is supervised, and it has a connect-time surveillance means to detect that the direct file time concerned reached the setup time. the communication device of the above-mentioned call origination side and a called party Maintaining the present direct file and continuing communication between both, when the direct file is being performed among both using one circuit and the above-mentioned connect-time surveillance means detects that the direct file time exceeded the above-mentioned setup time The communication network connecting means which make connection with the communications partner which went via the communication network using the circuit of another side, After succeeding in the connection via a communication network, it is composition equipped with a change means to cut the circuit which switches to the communication via a communication network and is used for a direct file.

[0148] This only performs easy operation for a direct file, and from a direct file, it is automatic to the communication via a communication network with cheap long distance phonecall charges, and changes to it, and the complicated operation and the complicated latency time accompanying the communication via a communication network are unnecessary entirely. Moreover, by setting up the time to communication change generating appropriately according to the accounting system of a use circuit, a user only does direct file operations (dial operation etc.), without being conscious of a communication network, and does so the effect that the communication mode of telex-rate gold which becomes cheap can be used as a result.

[0149] The network communication system concerning invention of a claim 2 is telephone equipment with which the communication device of the above-mentioned call origination side and a called party has a telephone call function in the composition of invention according to claim 1 as mentioned above, above-mentioned one circuit is used for a direct

telephone call, and the circuit of above-mentioned another side is composition used for the telephone call via a communication network.

[0150] Thereby, only by dial operation of the telephone number, the telephone call via communication networks, such as an Internet telephone, can be performed as if it was carrying out the usual telephone, and the same effect as invention of the above-mentioned claim 1 is done so.

[0151] It is network connection equipment for the network communication system concerning invention of a claim 3 connecting a terminal unit or a Local Area Network with the single communication device of the above-mentioned call origination side and a called party to a communication network in the composition of invention according to claim 1 as mentioned above.

[0152] Thereby, only by the easy operation accompanying a direct file, Internet VPN etc. can be constituted easily and the same effect as invention of the above-mentioned claim 1 is done so.

[0153] The network communication system concerning invention of a claim 4 In the composition of invention according to claim 3 as mentioned above, at least one side of the communication device of the above-mentioned call origination side and a called party Instead of the above-mentioned connect-time surveillance means, the communication amount of data after a direct file start with a communications partner is supervised. It is the composition which is equipped with an amount-of-data surveillance means to detect that the amount of data concerned reached preset value, replaces the connection via a communication network by the above-mentioned communication network connecting means with the above-mentioned connect-time surveillance means, and is performed based on the above-mentioned detection result of an amount-of-data surveillance means.

[0154] Thus, since the surveillance of communication data is possible when a communication device is network connection equipment, if it replaces with the surveillance of direct file time and the communication amount of data is supervised, the same effect as invention of the above-mentioned claim 3 will be acquired.

[0155] The network communication system concerning invention of a claim 5 is composition equipped with a notice means to notify the self identification information added to the communication data with which at least one side of the communication device of the above-mentioned call origination side and a called party went via the communication network to a communications partner into a direct file with a communications partner, as mentioned above in the composition of invention according to claim 1, 2, 3, or 4.

[0156] thereby, even if a partner's identification information is not known at the time of a communication (telephone call) start in addition to claims 1, 2, and 3 or the effect of the invention of 4, the effect of becoming connectable [a communication network course] is collectively done so

[0157] As mentioned above, in the composition of invention according to claim 5, the network communication system concerning invention of a claim 6 acquires the address as identification information each time, when the communication device of the above-mentioned called party makes dialup connection to the Internet which is a communication network.

[0158] Although the communication which went via a communication network besides relaying the server prepared on the Internet as a communication network was not completed in the former, the effect that it becomes possible without the relay of a server, it is not concerned with confusion of a server while the costs which communication takes are reducible in addition to the effect of the invention of a claim 5, but communication can do certainly by the composition of invention of the above-mentioned claim 6 does so collectively.

[Translation done.]

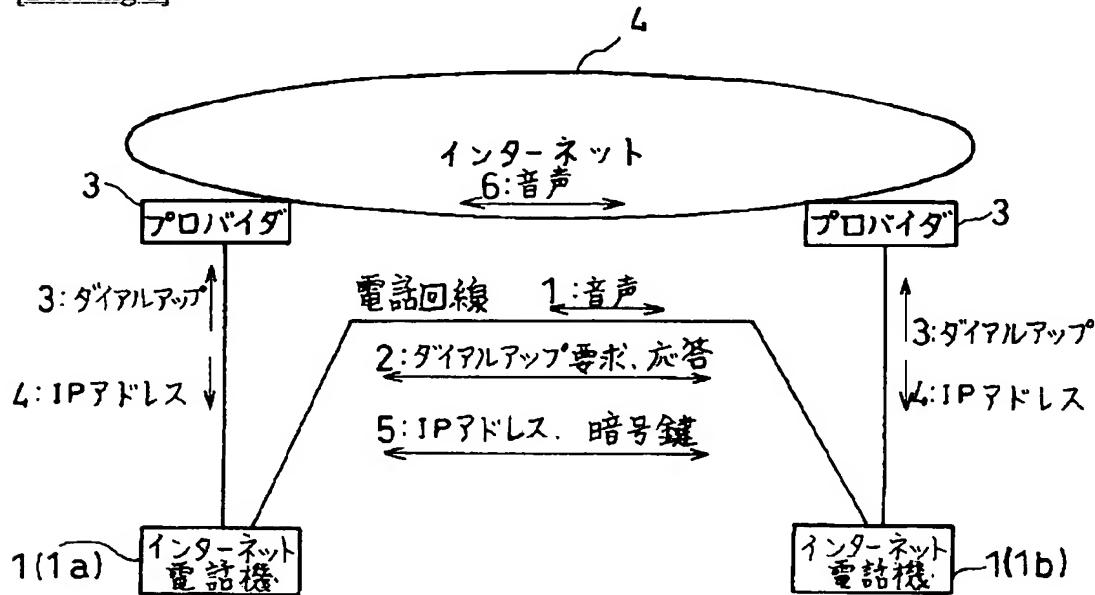
* NOTICES *

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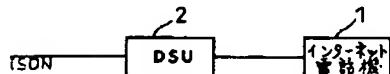
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

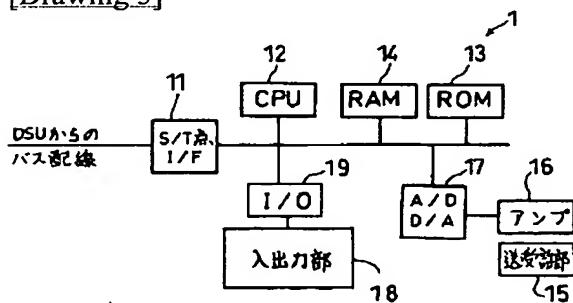
[Drawing 1]



[Drawing 2]

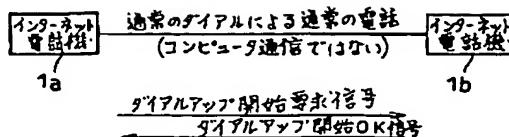


[Drawing 3]



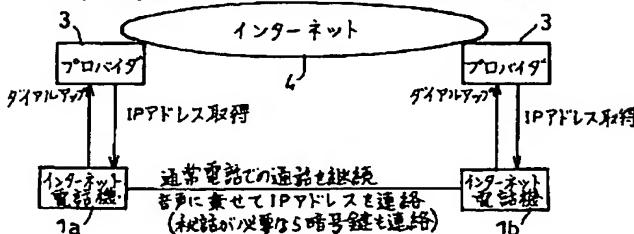
[Drawing 4]

通常通話



[Drawing 5]

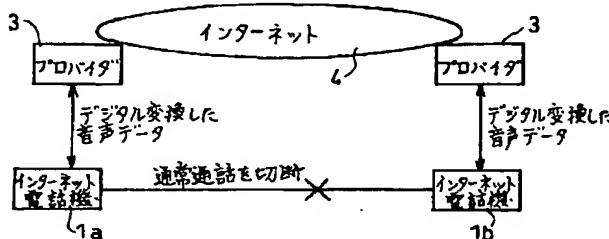
インターネット電話への切り替え操作開始(通常通話の継続)



[Drawing 6]

インターネット電話での通話

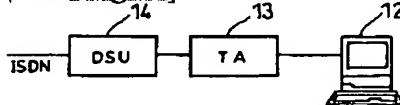
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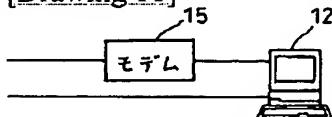
[Drawing 9]



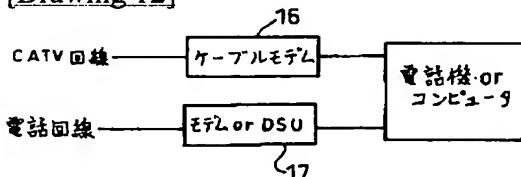
[Drawing 10]



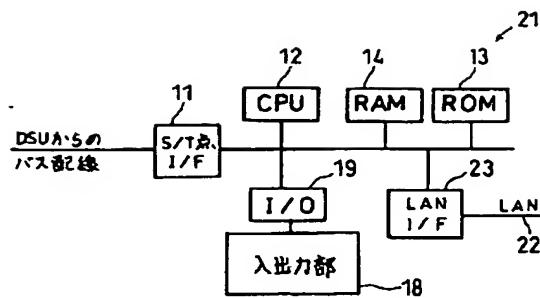
[Drawing 11]



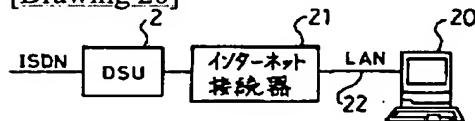
[Drawing 12]



[Drawing 14]

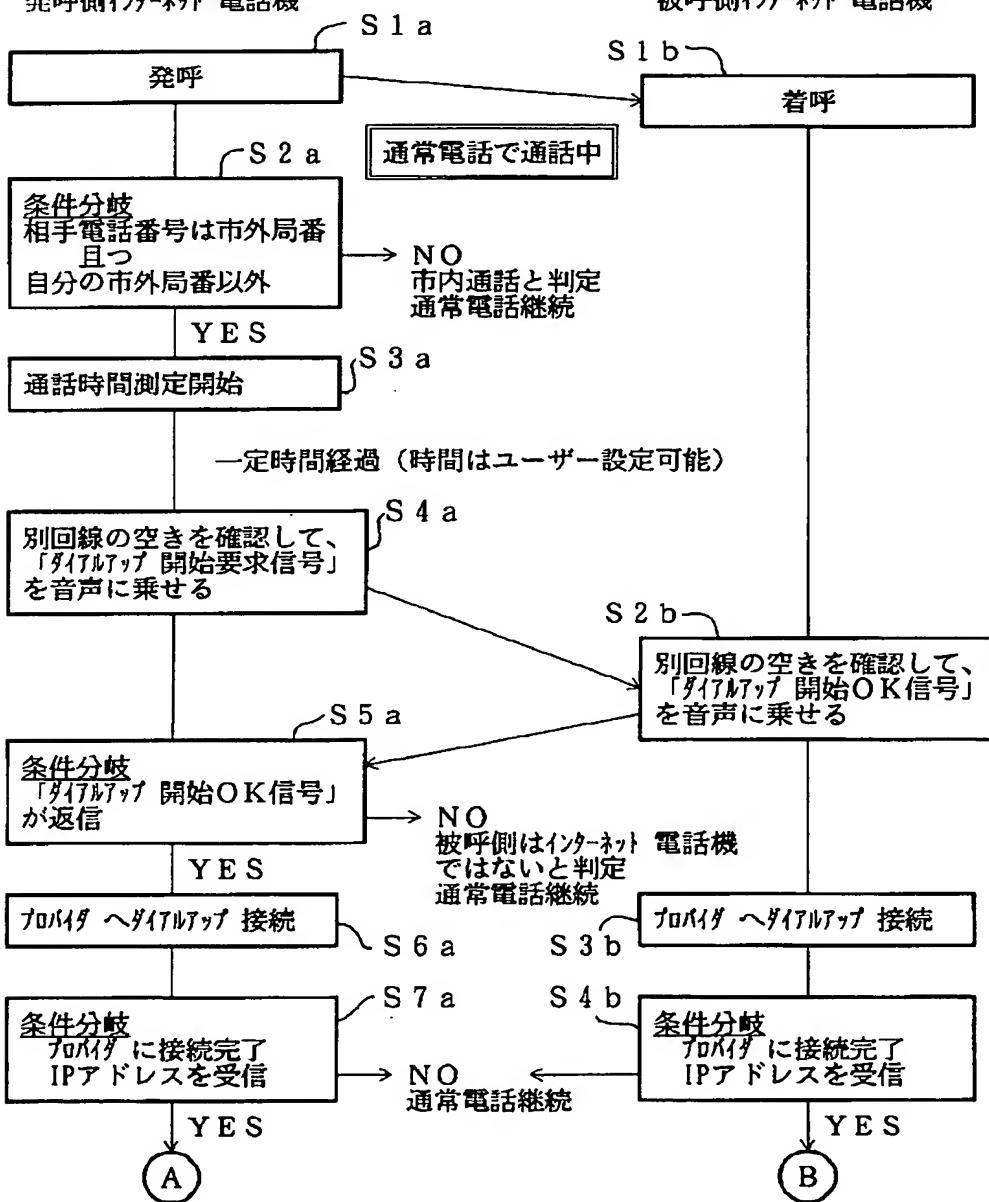


[Drawing 20]

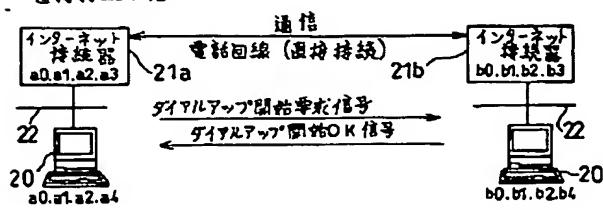


[Drawing 7]

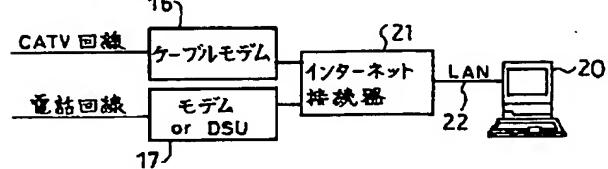
発呼側インターネット電話機



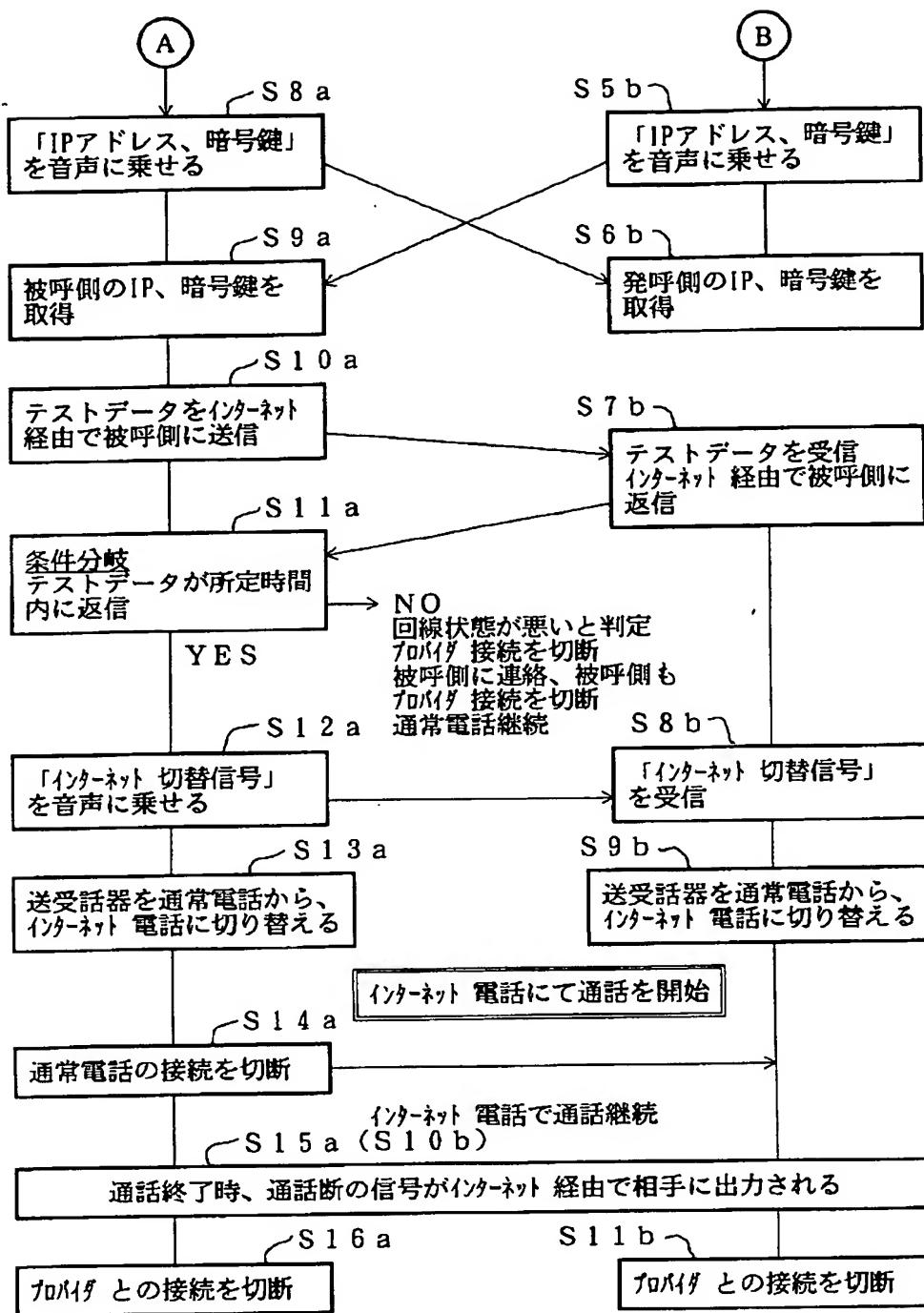
[Drawing 15]
直接接続状態



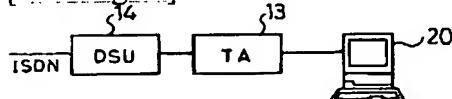
[Drawing 21]



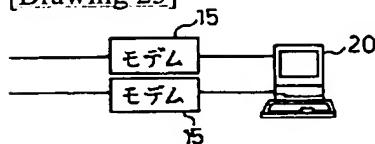
[Drawing 8]



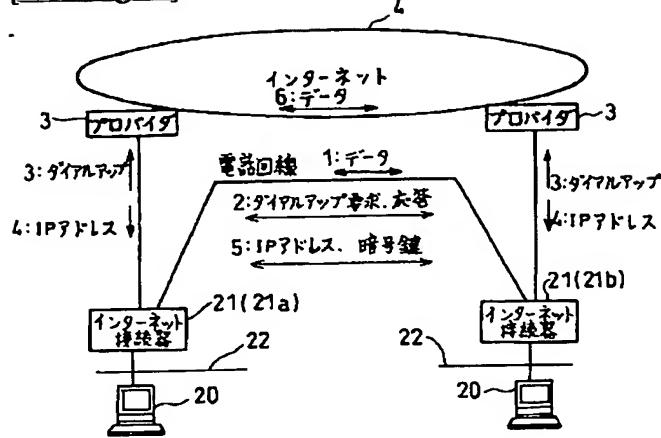
[Drawing 22]



[Drawing 23]

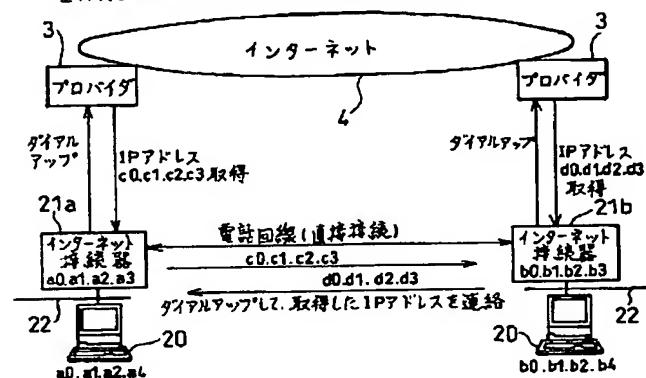


[Drawing 13]

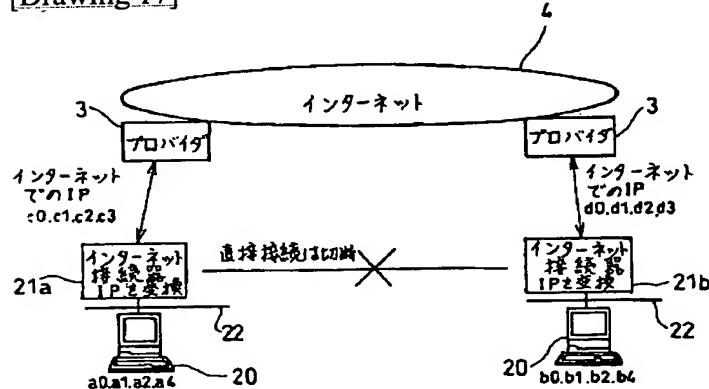


[Drawing 16]

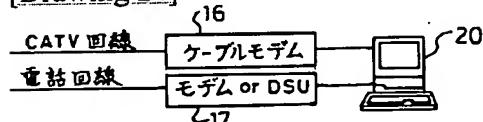
直接接続からインターネットVPN状態へ切り替え



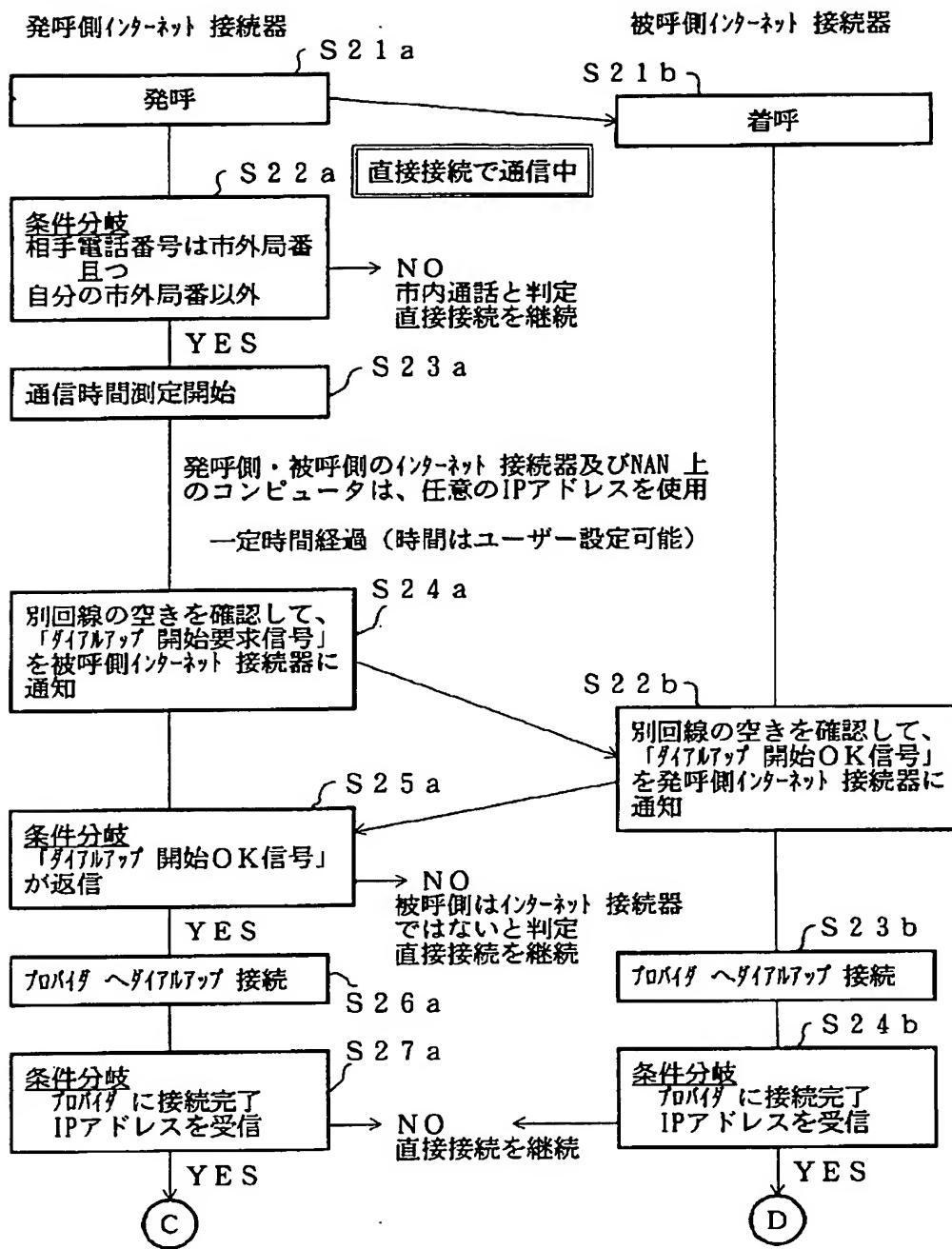
[Drawing 17]



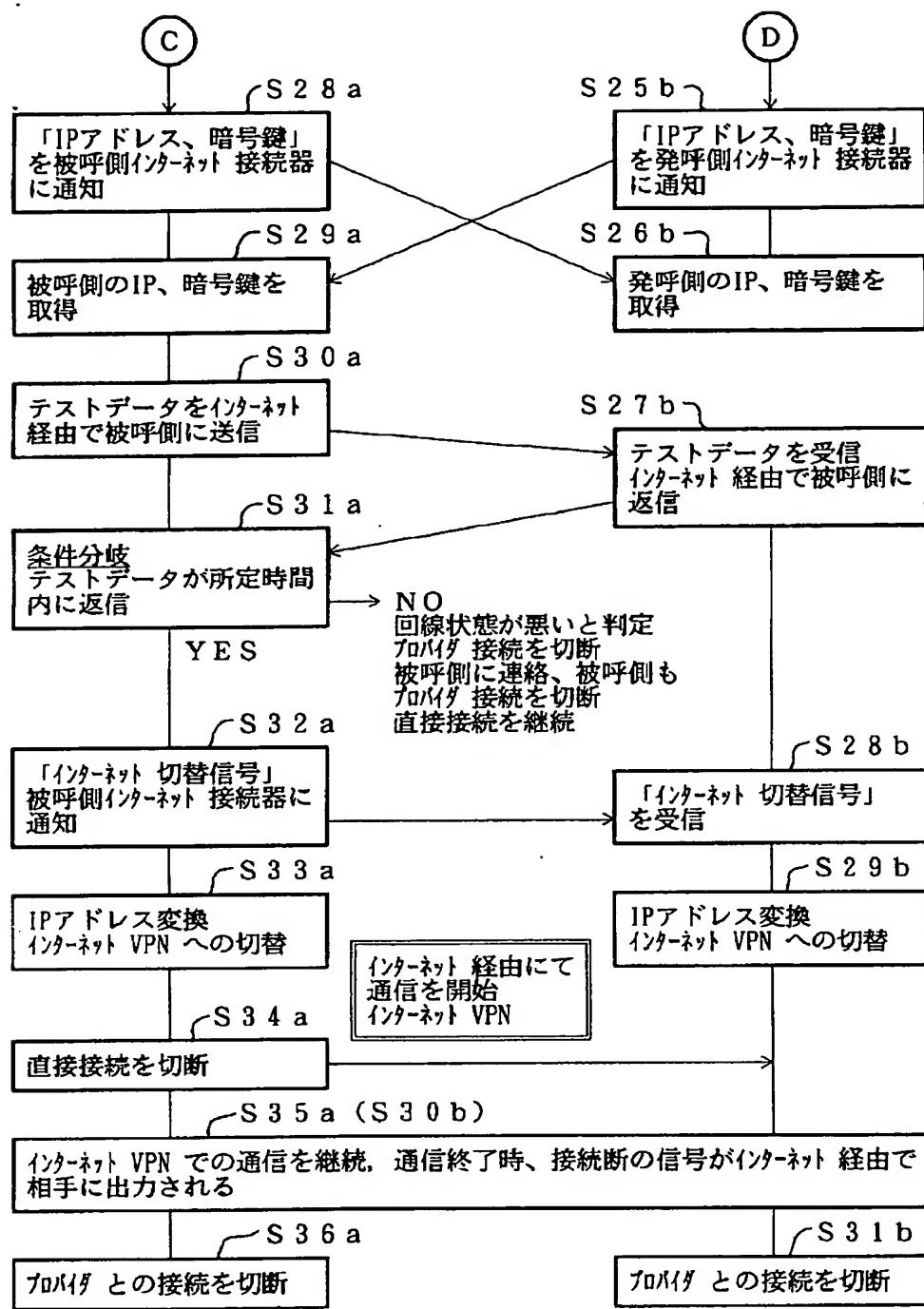
[Drawing 24]



[Drawing 18]



[Drawing 19]



[Translation done.]